

a. Geometric Improvements

- ❖ Maintaining Uniform Carriageway.
- ❖ Improvements to cross sectional elements.

b. Strengthening of Existing Pavement

- ❖ Filling of potholes / damaged portion with WMM.
- ❖ Overlay for existing carriageway.
- ❖ Strengthening of Carriage way.

c. Road Drainage

- ❖ Desilting of Existing Side Drains.
- ❖ Rectification of damaged drains.
- ❖ Flagging Coarse for Existing Drain.
- ❖ Replacing damaged / Missing cover slabs.

Chapter - 5

PROJECT COST ESTIMATES

5.1 Detailed Cost Estimate

Detailed cost Estimate has been worked out based on detailed engineering design

5.2 General

Cost Estimate is an important part of the Report as it provides vital input to financial evaluation of the project. The cost estimates have been prepared for Strengthening of the existing road including strengthening of longitudinal drains, road furniture, site clearance and Dismantling.

5.3 Basic rates

As part of Report, Rate Analysis of each of the item has been prepared by adopting PW, P & IWTDR SR 2018 - 19, Bangalore Circle. The rates as given in PW, P & IWTDR SR are to be enhanced by 6% for additional weightages for the works to be executed under extra ordinary conditions for Bangalore Metropolitan Limits. Items not covered in NHSR / PW, P & IWTDR SR have been based on market rates.

5.4 Project Management and Quality Control

Provision of around 2.00% of Construction Cost has been made towards Cost of DPR Preparation, Quality Control, PMC and Proof Checking.

5.5 Project Cost

The total project cost for the proposed work is 1500.00 Lakh.

Detailed Cost Estimate is enclosed in **Annexure A. 5.1**

The **Technical Advisory Committee (TAC)** was held on 21-05-2020, IPP Training Centre Malleshwaram, as per the instructions and guidelines suggested by the experts the inputs are incorporated in the design and estimate of the following project.

Annexure

FLEXIBLE PAVEMENT DESIGN

DESIGN TRAFFIC:

The following equation is used to compute the design traffic in terms of the cumulative number of standard axles.

$$N_s = \frac{365 \times ((1+r)^n - 1)}{R} \times A \times D \times F$$

Where,

N_s = Cumulative number of standard axles to be catered for in the design, MSA.

A = Initial Traffic

r = Annual growth rate of commercial vehicles

n = Design life in years

F = Vehicle Damage Factor

D = Lane distribution factor

The design traffic computed in terms of cumulative number of standard axles (msa).

City roads should be designed for minimum 2 msa traffic. (As per IRC 37 – 2012, Page No. 25, Plate 5)

The composition of pavement layers from the above Detailed Design is shown in table below.

Pavement compositions, Local Streets

Recommended for Surface course of 2 MSA		Recommended Base course of 2 MSA	
BC	DBM	WMM	GSB
40	---	250	---

Pavement compositions, Collector Streets

Recommended for Surface course of 2 MSA		Recommended Base course of 2 MSA	
BC	DBM	WMM	GSB
40	50	250	---

RIGID PAVEMENT DESIGN

RIGID PAVEMENT DESIGN:

A) The rigid pavement consists of cast in-situ/ premix concrete.

The slab design method is based on assessments of the:

- Predicted traffic volume and composition over the design period
- Strength of the subgrade in terms of its California Bearing Ratio
- Strength of the base concrete

B) A bound of lean mix concrete sub-base is recommended under a concrete pavement for one or more of the following reasons:

- To resist erosion of the sub-base and limit 'pumping' at joints and slab edges.
- To provide uniform support under the pavement
- To reduce deflection at joints and enhance load transfer across joints (especially if no other load transfer devices are provided, such as dowels); and
- To assist in the control of shrinkage and swelling of high-volume-change subgrade soils

Table 3.1 Approximate k Value Corresponding to CBR Values

Soaked subgrade CBR	2	3	4	5	7	10	15	20	50
k Value (MPa/m)	21	28	35	42	48	50	62	69	140

Table 3.2 Effective k Values Over Granular and Cementitious Subbases

Soaked CBR	2	3	4	5	7	10	15	20	50
k Value over granular subbase (thickness 150 to 250 mm), MPa/m	25	34	42	50	58	60	74	83	170
k Value over 150 to 200 mm cementations sub base MPa/m	42	56	70	84	96	100	124	138	280

The composition of pavement layers from the above Detailed Design is shown in table below.

Pavement compositions

Recommended Layers		
PQC	Base Course	Sub Base Course
150	150	150